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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/758,692

01/15/2004

Michifumi Shoda

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06/13/2006

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EXAMINER

CONSILVIO, MARK J

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/758,692

Applicant(s)

SHODA ET AL.

Examiner

Mark Consilvio

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,7,8 and 11-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,3,7,8 and 11-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/28/2006 has been entered.

Status of Claims

Claims 1-3, 7, 8, and 11-22 were previously rejected and claims 2, 3, 7, 11, and 17 are newly amended. Claims 2, 3, 7, 8, and 11-22 are currently pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for

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patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2, 3, 7, and 8 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sabia (US Application Patent No. 2003/0206347).

With respect to claims 3, 7, and 8, Sabia discloses an optical isolator element (10) comprising: at least one flat Faraday rotator (16), and at least two flat polarizers (12, 14), wherein the Faraday rotator and the polarizers are bonded to each other by van der Waals forces acting between bonding surfaces thereof, and a magnetic element (18) arranged around the optical isolator element, wherein the magnetic element is tubular and the optical isolator element is arranged inside the tubular magnetic element wherein the bonding surfaces of at least either one of the Faraday rotator and the polarizers are integrally provided with films (fig. 1A and par. 41).

Sabia does not expressly disclose the bonding surfaces brought into contact with each other while the bonding surfaces are activated such that atom bonds are present thereon. However, when the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim, the claim is unpatentable even if the prior product was made by a different process. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) and *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

Also, one of ordinary skill would understand that the vacuum bonding process taught by Sabia implicitly includes activating the bonding surfaces. This is achieved through the cleaning

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of the bonding surfaces and placing the surfaces in a high vacuum that “removes adsorbed water and hydrocarbons from the surface” or cleaning “via ion milling or other plasma techniques” (par. 22). This frees the atoms at the surface to bond with atoms of another optical surface.

Further, though Sabia does not expressly disclose that the films are made of a soft material which is softer than a dielectric hard material, the materials disclosed for these films have inherently varying degrees of hardness. Since the materials disclosed do not all have the same degree of hardness, clearly at least one of the disclosed materials must inherently be softer than the other dielectric hard materials. Specifically, silicon dioxide (SiO_2) is disclosed and is inherently softer than a hard dielectric material such as sapphire or diamond.

With respect to claim 2, Sabia discloses the bonding surfaces of at least either one of the Faraday rotator and the polarizers are integrally provided with an anti-reflection multi-layer film made of an inorganic material (par. 41).

Claims 11 and 13-16 are rejected under 35 U.S.C. 103(a) as obvious over Sabia (US Application Patent No. 2003/0206347).

With respect to claim 11, Sabia discloses or suggests a method for producing an optical isolator element (10) including at least one flat Faraday rotator (16) and at least two flat polarizers (12, 14) bonded to each other via their bonding surfaces comprising the steps of: activating the bonding surfaces of the Faraday rotator and the polarizers such that atom bonds are present thereon, and bring the Faraday rotator and the polarizers having the activated bonding surfaces into contact with each other in a vacuum at room temperature, thereby bonding the Faraday rotator and the polarizers by van der Waals forces acting created on the bonding

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surfaces of the Faraday rotator and the polarizers (pars. 21-23). As noted above, one of ordinary skill would understand that the vacuum bonding process taught by Sabia implicitly includes activating the bonding surfaces. This is achieved through the cleaning of the bonding surfaces and placing the surfaces in a high vacuum that “removes adsorbed water and hydrocarbons from the surface” or cleaning “via ion milling or other plasma techniques” (par. 22). This frees the atoms at the surface to bond with atoms of another optical surface.

Further, though Sabia does not expressly disclose that the films are made of a soft material which is softer than a dielectric hard material, the materials disclosed for these films have inherently varying degrees of hardness. Since the materials disclosed do not all have the same degree of hardness, clearly at least one of the disclosed materials must inherently be softer than the other dielectric hard materials. Specifically, silicon dioxide (SiO_2) is disclosed and is inherently softer than a hard dielectric material such as sapphire or diamond.

With respect to claim 13, Sabia discloses the bonding surfaces are so smoothed that the surface coarsenesses thereof are 10 nm or below (par. 27 and 29).

With respect to claim 14, Sabia discloses a pushing force is exerted in such a direction as to bond the Faraday rotator and the polarizers when the Faraday rotator and the polarizers having the bonding surfaces thereof are bonded with each other in vacuum (par. 22).

With respect to claims 15 and 16, Sabia discloses a step of integrally forming an anti-reflection multi-layer film made of a soft and inorganic material on the bonding surfaces of at least either one of the Faraday rotator and the polarizers is performed before the step of activating surfaces the bonding of the Faraday rotator and the polarizers (par. 41).

Claims 12 and 17-22 are rejected under 35 U.S.C. 103(a) as obvious over Sabia (US Application Patent No. 2003/0206347) in view of Kub et al. (Patent No. 6,153,495).

With respect to claims 12, 17, and 18, Sabia discloses or suggests all the limitations of claim 11 as stated supra. Also, Sabia discloses a step of smoothing and cleaning the bonding surfaces of the Faraday rotator and the polarizers is performed before the step of activating the bonding surfaces of the Faraday rotator and the polarizers (par. 27). While Sabia does not expressly disclose smoothing by chemical mechanical polishing, such a process is a well-known technique used to smooth direct bonding surfaces. Kub teaches such a technique is useful for preparing direct bonding surfaces (col. 6, lines 3-7). Therefore, at the time the invention was made, it would have been obvious to one of ordinary skill to include a step of chemical mechanical polishing to adequately reduce the surface roughness to a level appropriate for direct bonding.

With respect to claim 19, Sabia discloses the bonding surfaces are so smoothed that the surface coarsenesses thereof are 10 nm or below (par. 27).

With respect to claims 20 and 21, Sabia discloses a step of integrally forming films made of a soft and inorganic material on the bonding surfaces of at least either one of the Faraday rotator and the polarizers is performed before the step of activating surfaces the bonding of the Faraday rotator and the polarizers (par. 41).

With respect to claim 22, while Sabia discloses the step of activating the bonding surfaces is performed by projecting ion beams or neutral atoms onto the bonding surfaces (par. 22).

Response to Arguments

Applicant's arguments filed 02/16/2006 have been fully considered but they are not persuasive. In response to applicant's arguments, it is noted that applicant has quoted the contents of par. 42 of the Sabia reference not par. 41 as indicated in the previous office action. Also, the disclosed materials for the integral antireflection coating (i.e. SiO₂, ZrO₂, Al₂O₃, Nb₂O₅, etc...) are clearly inorganic and are softer than a hard dielectric material such as diamond. Further, it is noted that the feature upon which applicant relies (i.e., a particular interpretation of the phrase, "a soft material which is softer than a hard dielectric material") is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Hence, the phrase, "a soft material which is softer than a hard dielectric material," must be given its broadest reasonable interpretation. Thus, any material that is "softer" than any dielectric material meets the claimed limitation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Consilvio whose telephone number is (571) 272-2453. The examiner can normally be reached on Monday thru Friday, 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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